MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019/2020

TAT 3131 – AGENT TECHNOLOGY

(All sections / Groups)

24 October 2019
9:00 am – 11:00am
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of **SIX pages**, which includes the front cover, with **FIVE Questions** only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the answer booklet provided, and start each question on a new page.

Question 1 [12 marks]

(a) One of the questions about how multiagent systems stand with respect to other academic disciplines is that *aren't multiagent systems all about distributed/concurrent systems*? Clarify this statement.

[2 marks]

(b) *Delegation* and *intelligence* imply the need to build an agent system that can act effectively on behalf of human users. Identify and explain two abilities of such agent system.

[2 marks]

(c) Explain the differences between

(i) agent and standard object

[3 marks]

(ii) agent and expert system

[3 marks]

(d) Explain the following phrases:

(i) Synthesis algorithm is *sound*

(ii) Synthesis algorithm is *complete*

[2 marks]

Continued.....

Question 2 [12 marks]

(a) Explain the following phrases:

(i) Agent architecture

[2 marks]

(ii) Deductive reasoning agent

[2 marks]

(b) Much of the interest in agents from the artificial intelligence community has arisen from Shoham's notion of *agent oriented programming* (AOP) (Shonam, 1993). The first implementation of AOP was the AGENT0 programming language. AGENT0 has a set of commitment rules. Explain how a commitment rule is activated.

[2 marks]

(c) A practical reasoning agent implements *deliberation* and *means-end reasoning*.

(i) What is meant by *deliberation*?

[1 mark]

(ii) What is this *means-end reasoning*?

[1 mark]

(d) An example of reactive agent is a mobile robot built by Brooks (1986). The mobile robot has a *subsumption architecture*. Describe this *subsumption architecture*.

[4 marks]

References

Brooks, R. (1986) A robust layered control system for a mobile robot. *IEEE Journal on Robotics and Automation*, **2**(1), 14-23.

Shonam, Y. (1993) Agent-oriented programming. *Artificial Intelligence*, **60**(1), 51-92.

Continued.....

Question 3 [12 marks]

(a) Explain the following auction parameters:

(i) *open cry* versus *seal bid*

(ii) *private value* versus *common value*

[2 marks]

(b) Dutch auctions are an example of open-cry descending auction.

(i) Explain the procedure of Dutch auctions.

[2 marks]

(ii) Dutch auctions are susceptible to the *winner's curse*. Explain *winner's curse*.

[1 mark]

(c) Describe the rules of monotonic concession protocol.

[6 marks]

(d) Explain, by giving an example, the *logical* mode of argumentation.

[1 mark]

Continued.....

Question 4 [12 marks]

(a) A multiagent system has a form of organisation that defines roles, relationships and authority structures among its members (in this case, members are referred to as *agents*). Two types of organisation of a multiagent system are:

(i) Team

(ii) Hierarchies

Explain the characteristics of the above two types of organisation.

[3 marks]

(b) The table below shows the profits of two supermarkets (Kitmop and Jaya88) of cutting or not cutting selling price of goods. The profits of the two companies are indicated in an amount in the unit of RM 1 million. The cells filled in black indicate profits of the Jaya88.

		Jaya88 Supermarket			
		Cut price		Do not cut price	
Kitmop Supermarket	Cut price	15	15	25	10
	Do not cut price	10	25	20	20

(i) What is the dominant strategy of Kitmop Supermarket? Give a reason.

[3 marks]

(ii) What is the dominant strategy of Jaya88 Supermarket? Give a reason.

[3 marks]

(iii) By referring to the outcomes from (i) and (ii), what is the profit of each supermarket?

[1 mark]

(iv) Does the dilemma of prisoners exist in this scenario? Explain why.

[2 marks]

Continued.....

Question 5 [12 marks]

(a) Explain the following three aspects of speech acts. Give an example for each speech act.

(i) Locutionary act

(ii) Illocutionary act

(iii) Perlocutionary act

[3 marks]

(b) The knowledge query and manipulation language (KQML) and the knowledge interchange format (KIF) are used to exchange messages among agents.

(i) Explain the role of KQML and KIF in message generation and exchange.

[2 marks]

(ii) Convert the following dialogue into KQML/KIF format.

> Agent A asks Agent B: Is the weight of a telephone greater than the weight of a cellphone?
>
> Agent B replies Agent A: Yes
>
> Agent B informs Agent A: The length of a telephone is 800g

[3 marks]

(c) The Foundation for Intelligent Physical Agents (FIPA) defined "Inform" and "Request" as two basic performatives made up of two parts: pre-condition and rational effect. Explain each of these two FIPA performatives.

[4 marks]

End of Paper